

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have amended the Title.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-8 Under 35 U.S.C. § 103

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yonemura (JP 2003-346888) in view of Ohba et al. (USP No. 5,989,750). Applicants respectfully traverse the pending rejection for at least the following reasons.

With regard to the present disclosure, independent claim 1 recites, in-part, a lead storage battery including: a positive electrode grid, a negative electrode grid, a positive electrode connecting member, and a negative electrode connecting member comprising a Pb-alloy including at least one of Ca and Sn, the negative electrode grid further includes Sb in a part thereof excluding said tab, and the separator includes silica.

Features of the present disclosure include a lead storage battery that includes both a negative electrode grid which includes Sb (not including the tab), and a separator which includes silica. As a result of this combination, the corrosion at the tab of the negative electrode is significantly suppressed and the service life of the battery is remarkably improved in the usage mode in which charge and discharge are frequently repeated under a low SOC range.

It is admitted in the Office Action that Yonemura fails to disclose a separator that includes silica. Ohba is relied on as curing this deficiency of Yonemura. However, it does not

appear that Ohba discloses utilizing the silica to prevent the corrosion of the tab on the negative electrode grid. Rather, Ohba is silent with respect to the use of silica to prevent corrosion. As such, there is no basis or motivation to combine the silica of Ohba with the battery of Yonemura cited references.

Moreover, as is shown in Table 1 of the present disclosure, unexpected and superior results are shown for batteries having the above-mentioned combination. For example, in battery B4 corresponding to one embodiment of the present disclosure, which has silica content of 35% and Sb content of 0.006%, the corrosion at the tab of the negative electrode grid is significantly suppressed (3.3%) and the service life is remarkably improved (76800 cycles).

In contrast, batteries outside the range which correspond to batteries of the cited prior art do not exhibit superior characteristics. For example, battery A4 (silica content 35%, 0% Sb – corresponds to Yonemura) corrosion rate of 80.6% and a cycle life of 25,500 cycles; and battery B1 (silica content 35%, 0% Sb – corresponds to Ohba) has a high corrosion rate (2.0%) but extremely low cycle life (22,100 cycles). As such, it is clear that the proposed combination of references fails to predict or suggest the unexpected results obtained from the claimed disclosure. Accordingly, it is clear that Yonemura and Ohba do not render independent claim 1 of the present disclosure obvious.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons

set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Rejection Of Claims 1-4 and 8 Under Nonstatutory Double Patenting Doctrine

Claims 1-4 and 8 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 and 6 of copending U.S. Application No. 10/585,078 in view of Yonemura; and claim 1 stands rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending U.S. Application No. 10/587,187 in view of Yonemura and Ohba.

However, since these rejections are provisional, Applicants respectfully request that the rejection be withdrawn until such time as claims in either application have been indicated to be allowable. As claims are often amended during prosecution, it is possible that the claims determined to be allowable may be patentably distinct from one another. According to PAIR, as of today May 20, 2009, the claims of Application Nos. 10/587,187 and 10/585,078 have yet to be allowed.

V. Conclusion


Having responded to all open issues set forth in the Office Action, it is respectfully submitted that all claims are in condition for allowance.

Application No.: 10/587,186

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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